

4.2.6. FLIR Pointing Accuracy

4.2.6.1. Purpose

The purpose of this test is to measure the accuracy of the FLIR display horizontal and vertical pointing angle indications and their effects upon the utility of the FLIR display for orienting the operator to the actual position of the target relative to the aircraft.

4.2.6.2. General

Often the operator will want to slew the FLIR to view in detail a target that has caught his or her attention visually. Additionally, the operator may want to visually find a target he or she has detected on the FLIR. For this reason, the accuracy of the display of the FLIR pointing angles is important. Additionally, the azimuth and elevation scales are used in the measurement of the field of regard and must be verified prior to this important test.

4.2.6.3. Instrumentation

A piece of chalk, protractor, plumb bob, cord, tape measure and data cards are required for this test. A voice recorder is optional.

4.2.6.4. Data Required

Record the actual and displayed horizontal angle from the FLIR reticle to the test target over each 30° increment from the fuselage reference line to the left and right limit. Record the actual and displayed vertical angle from the FLIR reticle to the test target over each 30° increment from the plane passing through the FLIR reticle center perpendicular to the local vertical to the upper and lower limit. Record the angle from the horizontal plane to the fuselage reference line. Record qualitative comments concerning the utility of the FLIR pointing angle display accuracy for visually finding targets displayed at the FLIR crosshairs and for positioning the FLIR crosshairs over targets found visually.

4.2.6.5. Procedure

Obtain the angle of the fuselage reference line from the horizontal plane while the aircraft is sitting on its landing gear. The angle may be found within the aircraft engineering documents. The contractor for the airframe will be able to supply these

angles. For the sample system, the FLIR is aligned to the aircraft fuselage reference line.

Park the airplane perpendicular to a wall, with the nose pointed at the wall and approximately 30 feet away. Use the plumb bob to mark a point on the deck with the chalk directly below the swivel point of the FLIR reticle. Use the tape measure to determine the distance from the center of the FLIR reticle swivel point to the deck. Align the cord with the longitudinal axis of the aircraft and on top of the chalk mark below the FLIR. Extend the cord in front of the airplane to the wall. Mark this spot with chalk.

Use the plumb bob and tape measure to place a small, warm object above the first spot on the wall at the same height above the ground as the reticle center. Have the operator place the crosshairs over the target and record the indications on the vertical and horizontal scales. Use the protractor to swivel the cord at 30° increments to the left to the angular limits of the FLIR and then to the right. At each point, use the plumb bob to place a target at the same approximate height as the first target and have the operator place the crosshairs over the target and mark the position on the horizontal scale. Use the cord and the protractor to mark positions on the wall and the floor at 10' above and 30' increments below the horizontal position from the FLIR swivel point. Mark points to the FLIR angular limits or as high up the wall as practicable. At each point, place a warm target, have the operator place the cursors over the target and mark the position on the vertical scale.

While airborne, visually find targets of opportunity at various positions from the aircraft. Estimate the angles to the targets and slew the FLIR to the estimated positions, acquiring the target. Next, find targets of opportunity with the FLIR and then use the scale positions to visually acquire the targets. Qualitatively assess the utility of the indications for performing these visual tasks.

4.2.6.6. Data Analysis and Presentation

Subtract the horizontal scale indications from the measured horizontal target positions. For the vertical positions, add the angle of the fuselage reference line above the horizon (or subtract for an angle below the horizon)

to the measured positions of the target. Subtract the vertical scale indications from the adjusted, measured target positions. For each scale, plot the error versus the scale indications. Relate the error to the utility of the scale indications for visually finding targets first noted using the FLIR and for finding targets first noted visually on the FLIR scene.

4.2.6.7. Data Cards

Sample data cards are presented as card 62.

CARD NUMBER _____

FLIR POINTING ACCURACY (GROUND TEST)

[POSITION THE AIRCRAFT PERPENDICULAR TO THE WALL AND 30 FEET AWAY, NOSE ON. MARK THE POSITION BELOW THE FLIR SWIVEL POINT. MARK THE EXTENSION OF THE FUSELAGE REFERENCE LINE (FLR) ON THE WALL AND THE VERTICAL POINT ON THE WALL LEVEL WITH THE RETICLE. SLEW THE CROSSHAIRS OVER THE POINT AND MARK THE SCALES. REPEAT AT 30° INCREMENTS TO THE LEFT AND THE RIGHT. OVER THE NOSE OF THE AIRCRAFT, MARK POINTS 10° ABOVE AND 30° BELOW THE HORIZON LINE AND REPEAT.]

FRL POSITION _____ ABOVE/BELOW HORIZON

CENTERLINE/LEVEL _____/_____

HORIZONTAL SCALE

LEFT 30° _____

60° _____

90° _____

120° _____

150° _____

180° _____

200° _____

RIGHT 30° _____

60° _____

90° _____

120° _____

150° _____

180° _____

200° _____

VERTICAL SCALE

ABOVE 10° _____

20° _____

BELOW 30° _____

60° _____

90° _____

CARD NUMBER _____ TIME _____ PRIORITY L/M/H

FLIR POINTING ACCURACY (AIRBORNE TEST)

[CLIMB TO _____ FEET AGL AND SET _____ KIAS. VISUALLY FIND TARGETS OF OPPORTUNITY AND SLEW THE FLIR TO THEIR POSITION, ACQUIRING THEM ON THE FLIR IN THE WFOV. FIND TARGETS ON THE FLIR AND ATTEMPT TO ACQUIRE THEM VISUALLY. QUALITATIVELY EVALUATE THE UTILITY OF THE SCALE ACCURACY.]

COMMENTS: